

ABSTRACT OF THE DISCLOSURE

- An improved epitaxial wafer and growth method of III-V nitrides (III-V compound semiconductor which contains nitrogen as a group-V element, written as InGaAlBNAsP alloy, typically GaN, AlN, InN, or ternary alloy system of two of the three) on large diameter substrates with flat surfaces and better crystal quality is provided. A III-V nitrides alloy thin film is formed by spin-coating on substrates. Liquid containing group III elements and nitrogen is spread on substrates. Then the substrate is coated with thin film from the liquid by spinning it at certain rotation speeds. The film and substrate is annealed to crystallize the spin-coated film in a gas atmosphere, where the gas atmosphere includes a gas, where the gas includes nitrogen as an element. This film is used as a buffer layer for subsequent epitaxial growth of large area III-V nitrides to obtain flat surfaces together with good crystal quality and uniformity. Oxide buffer layer such as zinc oxide, magnesium oxide, aluminum oxide is also spin-coated and annealed in a gas atmosphere in which a gas contains oxygen as an element. III-V Nitride is overgrown on the crystallized oxide buffer layer.